In re Application of: Wiley
Application Serial No.: 10/723,028

Amendments to the Claims

1. (currently amended) A method of increasing the photosensitivity of hydrogen-loaded optical fibers, the method comprising the steps of:

A. providing at least one hydrogen-loaded optical fiber having a cladding and a core; and

B. relocating hydrogen atoms disposed within the optical fiber from the proximity of the cladding to the proximity of the core, said relocating comprising:

i) generating a temperature gradient between the cladding and the core by applying at least one burst of a fluid heated to a temperature of at least about 100°C to the cladding of the at least one optical fiber.

2. (original) The method of claim 1, wherein the fluid comprises at least one of an inert gas or air.

3. (original) The method of claim 1, wherein the temperature is not greater than about 1200°C.

4. (original) The method claim 1, wherein the temperature is between about 700°C and 900°C.

5. (original) The method of claim 1, wherein the at least one optical fiber includes a plurality of optical fibers.

6. (original) The method claim 1, wherein step B includes applying the at least one burst of a heated fluid for about 0.10 millisecond to about 1 second.

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7. (currently amended) A method of increasing the photosensitivity of at least one hydrogen-loaded optical fiber having a cladding and a core, the method comprising the steps of:

A. heating a gas to at least about 100°C;

B. applying the heated gas to a portion of the cladding of the at least one optical fiber; and

C. maintaining the application of the heated gas on the at least one optical fiber for a period sufficient for generating a temperature gradient between the cladding and the core and relocating hydrogen atoms disposed within the optical fiber from the proximity of the cladding to the proximity of the core, such that the concentration of hydrogen atoms at the core is greater than the concentration of hydrogen atoms at the cladding.

8. (currently amended) A method of preparing at least one hydrogen-loaded optical fiber for the writing of gratings, the fiber having a core, a cladding and a coating and the method comprising the steps of:

A. heating a gas to at least about 100°C;

B. applying the heated gas to a portion of the at least one optical fiber; and

C. maintaining the application of the heated gas on the at least one optical fiber for a period sufficient for:

i) stripping the coating from the portion of the at least one optical fiber; and

ii) generating a temperature gradient between the cladding and the core and, as a result, relocating hydrogen atoms disposed within the at least one optical fiber from the proximity of the cladding to the proximity of the core, such that the concentration of hydrogen atoms at the core is greater than the concentration of hydrogen atoms at the cladding.

9. (original) The method of claim 8, wherein the period is about 0.10 millisecond to about 1 second.

10. (original) The method of claim 8, wherein the temperature is between about 800°C and 900°C.

11. (original) The method of claim 8, wherein the fluid comprises at least one of an inert gas or air.

12. (currently amended) A method of writing gratings in at least one hydrogen-loaded optical fiber having a cladding and a core, the method comprising the steps of:

A. heating a gas to at least about 100°C;

B. applying the heated gas to a portion of the at least one optical fiber;

C. maintaining the application of the heated gas on the at least one optical fiber for a period sufficient for generating a temperature gradient between the cladding and the core and relocating hydrogen atoms disposed within the at least one optical fiber from the proximity of the cladding to the proximity of the core, such that the concentration of hydrogen atoms at the core is greater than the concentration of hydrogen atoms at the cladding;

D. providing a phase mask having a pattern of troughs formed therein; and

E. directing ultraviolet light onto the at least one optical fiber through the phase mask.

13. (original) The method of claim 12, wherein the period is about 0.10 millisecond to about 1 second.

14. (original) The method of claim 12, wherein the temperature is between about 700°C and

900°C.

15. (original) The method of claim 12, wherein the fluid comprises at least one of an inert gas or air.

16. (original) The method of claim 12, wherein the at least one optical fiber includes a coating and step C includes stripping the coating from the optical fiber.

17. (currently amended) A system for increasing the photosensitivity of hydrogen-loaded optical fibers having a cladding and a core, with at least some hydrogen atoms disposed distal to said core, the system comprising :

A. at least one fiber holder configured for supporting at least one hydrogen-loaded optical fiber; and

B. a high-temperature-burst source configured to direct at least one burst of a fluid heated to a temperature of at least about 100°C onto the at least one optical fiber when disposed within said at least one fiber support,

wherein application of the heated fluid to the at least one optical fiber causes <u>a temperature gradient between the cladding and the core and</u> a relocation of at least some the hydrogen atoms disposed distal to the core to the proximity of the core.

18. (original) The system of claim 17, wherein the fluid comprises at least one of an inert gas or air.

19. (original) The system of claim 17, wherein the temperature is not greater than about 1200°C.

20. (original) The system of claim 17, wherein the temperature is between about 700°C and

900°C.

21. (original) The system of claim 17, wherein the at least one optical fiber includes a plurality of optical fibers.

22. (original) The system of claim 17, wherein the at least one burst of a heated fluid has a duration in the range of about 0.10 millisecond to about 1 second.

23. (currently amended) A system for increasing the photosensitivity of at least one hydrogen-loaded optical fiber having a cladding and a core, with at least some hydrogen atoms disposed distal to said core, the system comprising:

A. a gas source;

B. a heat transfer conduit coupled to the gas source and including a heater configured to heat gas delivered from the gas source to at least about 100°C; and

C. an output nozzle coupled to the heat transfer conduit and configured to apply the heated gas to a portion of the at least one optical fiber,

wherein application of the heated gas to the at least one optical fiber causes a temperature gradient between the cladding and the core and a relocation of the hydrogen atoms disposed within the at least one optical fiber from the proximity of the cladding to the proximity of the core.

24. (original) The system of claim 23, further comprising:

D. a controller operatively coupled to the gas source, heat transfer conduit, or output nozzle, and configured to control the application of the heated gas to the at least one optical fiber.

25. (original) The system of claim 23, wherein the gas comprises at least one of an inert gas

or air.

26. (original) The system of claim 23, wherein the temperature is not greater than about 1200°C.

27. (original) The system of claim 23, wherein the temperature is between about 700°C and 900°C.

28. (original) The system of claim 23, wherein the at least one optical fiber includes a plurality of optical fibers.

29. (original) The system of claim 23, wherein the at least one burst of a heated fluid is applied for a duration in the range of about 0.10 millisecond to about 1 second.

30. (currently amended) A system for preparing at least one hydrogen-loaded optical fiber for making gratings, the at least one hydrogen-loaded optical fiber having a cladding, a core and a coating, with at least some hydrogen atoms disposed distal to said core, the system comprising:

A. a gas source;

B. a heat transfer conduit coupled to the gas source and including a heater configured to heat gas delivered from the gas source to at least about 100°C; and

C. an output nozzle coupled to the heat transfer conduit and configured to apply the heated gas to a portion of the at least one optical fiber,

wherein application of the heated gas to the optical fiber causes a stripping of the coating from the at least one optical fiber and <u>a temperature gradient between the cladding and the core and</u> a relocation of the hydrogen atoms disposed within the at least one optical fiber from the proximity of the cladding to the proximity of the core.

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31. (currently amended) A system for making gratings in at least one hydrogen-loaded optical fiber having a cladding and a core, with at least some hydrogen atoms disposed distal to said core, the system comprising:

A. a gas source;

B. a heat transfer conduit coupled to the gas source and including a heater configured to heat gas delivered from the gas source to at least about 100°C;

C. an output nozzle coupled to the heat transfer conduit and configured to apply the heated gas to a portion of the at least one optical fiber, wherein application of the heated gas to the at least one optical fiber causes <u>a temperature gradient between the cladding and the core and</u> a relocation of the hydrogen atoms disposed within the at least one optical fiber from the proximity of the cladding to the proximity of the core;

D. a phase mask having a pattern of troughs formed therein; and

E. ultraviolet light source configured for directing ultraviolet light onto the at least one optical fiber through the phase mask.